WE CLAIM

1. A system for directing gas towards a specimen, said apparatus comprising:

means for directing a beam of charged particles towards the specimen; and

a gas conduit providing gas to an area of incidence of said beam of charged particles onto said specimen; whereas the gas conduit comprising:

an intermediate portion having a first end for receiving the inert gas and a substantially sealed second end;

whereas the intermediate portion has an first and second apertures that are positioned such as to define a space through which the beam of charged particles can propagate; and whereas the intermediate portion is shaped such as to allow a first portion of the inert gas to exit the second aperture and to allow a second portion of the gas to propagate towards the second end and to be returned through the second aperture.

2. The system according to claim 1, wherein the first portion and the second portion of the gas exit the second aperture at substantially opposite directions.

3. The system of claim 1 wherein the first portion and the second portion of gas form a symmetrical gas distribution pattern in relation to an optical axis of the beam of charged particles.

4. The system according to claim 1, wherein the gas conduit generates a substantially rotational symmetrical magnetic field at the vicinity of the apertures.

5. The system according to claim 1 whereas the intermediate portion is U-shaped.

6. The system of claim 1 wherein the first and second system are positioned at substantially a middle of the intermediate portion.

7. The system of claim 1 wherein the intermediate portion is saddle shaped.

8. The system of claim 1 wherein the second aperture is larger than the first aperture.

9. The system of claim 1 where the first and second apertures have substantially symmetrical shapes.

10. The system of claim 1 wherein the intermediate portion is shaped such as to prevent substantial beam deflection due to charging of the intermediate portion from interactions with charged particles returning from the specimen.

11. The system of claim 1 wherein the intermediate portion has a substantially symmetrical portion that defines the apertures.

12. The system of claim 11 wherein the substantial symmetrical portion is sized and positioned such as to interact with most of the charged particles returning from the specimen.

13. The system of claim 11 wherein the substantially symmetrical portion is at least 1mm long.

14. The system of claim 1 wherein the first portion is directed towards the substrate at a first angle that is slightly smaller than ninety degrees and whereas the second portion is directed towards the substrate at a second angle that is slightly larger than ninety degrees.

15. The system of claim 12 wherein the first angle ranges between 60-89 degrees and wherein the second angle ranges between 91 and 120 degrees.

16. An apparatus for directing gas towards a specimen, said apparatus comprising:

a first gas conduit portion oriented at a first positive angle in relation to an imaginary axis that is perpendicular to a central gas conduit portion;

a second gas conduit portion oriented at a second negative angle in relation to the imaginary axis;

a central gas conduit portion, coupled to the first and second gas conduit portions, the central gas conduit portion defines a first aperture and a second aperture; whereas the central gas conduit portion is shaped such as to allow gas to exit via the second aperture at multiple directions; whereas the first and second apertures define a passage; and whereas the central gas conduit is shaped such as to induce a substantially rotationally symmetrical magnetic field at a vicinity of the space.

17. The apparatus of claim 16 wherein the passage is shaped such as to allow the passage of a beam of charged particle beam.

18. The apparatus of claim 17 wherein the second gas conduit receives gas from the central gas conduit portion and returns at least a portion of said received gas to the central gas conduit portion.

19. The apparatus of claim 17 wherein the second gas conduit receives gas from the means for providing gas.

20. The apparatus of claim 17 wherein the first and second apertures define a space through which a beam of charged particles can propagate.

21. The apparatus according to claim 17, wherein the gas exits the second aperture at substantially opposite directions.

22. The apparatus of claim 17 wherein the gas exits the second aperture to form a symmetrical gas distribution pattern.

23. The apparatus according to claim 17, wherein the central gas conduit portion generates a substantially

rotational symmetrical magnetic field at the vicinity of the apertures.

24. The apparatus according to claim 17 whereas the first, second and central gas conduit portions form a U.

25. The apparatus of claim 17 wherein the second aperture is larger than the first aperture.

26. The apparatus of claim 17 where the first and second apertures have substantially symmetrical shapes.

27. A method of directing gas towards a specimen, the method comprises the stages of:

receiving gas at a gas conduit that defines at least one aperture shaped such as to allow gas to exit and a beam of charged particle to propagate;

directing the gas towards the specimen at a positive direction and at a negative direction in relation to an imaginary axis that is perpendicular to an aperture out of the at least one apertures; and

maintaining a substantially symmetrical magnetic filed while receiving charged particles from the specimen.

28. The method of claim 27 further comprising a stage of interacting at least a portion of the gas with a beam of charged particles directed toward the specimen.

29. The method of claim 28 wherein the interaction results in milling the specimen.

30. The method of claim 28 wherein the interaction results in imaging the specimen.

31. The method of claim 28 whereas the charged particles are electrons.

32. The method of claim 28 whereas the charged particles are ions.

33. The method of claim 28 wherein the stage of directing the gas partially overlaps with a stage of

directing a beam of charged particles towards the specimen.

34. The method of claim 28 wherein the stage of directing the gas does not overlaps with a stage of directing a beam of charged particles towards the specimen.

35. The method of claim 28 wherein the stage of directing comprises: directing received gas towards a second aperture; whereas a first portion of the gas exits via the second aperture while another portion propagates through a portion of the gas conduit to be retuned to the second aperture.